Important Advances in Clinical Medicine

Epitomes of Progress -- Anesthesiology

The Scientific Board of the California Medical Association presents the following inventory of items of progress in Anesthesiology. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in Anesthesiology which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Anesthesiology of the California Medical Association and the summaries were prepared under its direction.

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Muscle Relaxants

Recent experimental and clinical studies greatly increased our understanding of the influence of various factors on the pharmacological effects of muscle relaxants. This new information markedly influenced the choice and mode of administration of available muscle relaxants and the search for better ones.

It was observed that the prolonged administration of depolarizing relaxants may cause desensitization of the neuromuscular junction and difficulties in the postanesthetic reestablishment of neuromuscular transmission. It was also demonstrated that the decreased rate of metabolic transformation of succinylcholine by inherited abnormalities of plasma cholinesterase and other pathological changes (for example, liver disease) or the intentional or accidental administration of anticholinesterases may cause prolonged postoperative apnea. In infants, in severely burned or traumatized patients, and in the presence of certain neurological conditions (for example, paraplegia), succinylcholine may cause severe arrhythmias or even cardiac arrest.

Because of the possibility of such difficulties, there has been an increasing tendency to provide surgical relaxation with nondepolarizing relaxants. The presently available nondepolarizing agents [for example, d-tubocurarine chloride; gallamine triethiodide (Flaxedil®)], however, lack the controllability of succinylcholine and may also have undesired effects. Two other nondepolarizing agents, diallylnortoxiferine chloride (Alloferine®) and pancuronium bromide (Pavulon®),

are relatively free of unwanted side effects. It is expected that pancuronium will be available for clinical use in the near future.

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Foldes FF, Klonymus DH, Maisel W, et al: Studies of pancuronium in conscious and anesthetized man. Anesthesiology 35:496-503, Nov 1971

Recent Advances in Obstetric Anesthesia

The most important recent advances in obstetric anesthesia are not the new drugs or techniques that have been introduced to provide better analgesia. Rather, they are the major modifications of older established techniques with a view toward preventing serious anesthetic complications such as maternal hypotension and aspiration pneumonitis.

Maternal hypotension may occur in as many as 80 percent of parturients following regional anesthesia for cesarean section. However, with aggressive prophylactic measures the incidence decreases to less than 15 percent. Hypotension is due to a combination of sympathetic blockade and compression of the vena cava by the gravid uterus. Anticipating sympathetic paralysis, many anesthesiologists routinely administer a liter of lactated Ringer's solution intravenously and ephedrine 50 mg intramuscularly within 20 minutes of the block. Immediately following the block and before operation, the uterus is displaced off the inferior vena cava. Left uterine displacement is most easily and successfully accomplished with the use of a mechanical device attached to the surgical table. If such an apparatus is not available, a small pillow placed under the right hip, together with lateral tilting of the surgical table, occasionally is effective in producing left uterine displacement. Should hypotension occur, recent studies have indicated that vasopressors such as ephedrine, Wyamine® or Aramine® are effective in restoring uterine blood flow following spinal hypotension. Pure vasoconstrictor drugs such as Vasoxyl® or Neosynephrine® should be avoided, as these drugs, although restoring the blood pressure, produce further decreases in uterine blood flow with subsequent fetal hypoxia and acidoses.

Aspiration pneumonitis is most easily prevented by avoiding general anesthesia. However, if general anesthesia is used, many anesthesiologists routinely protect the airway of the patient by endotracheal intubation. Because regurgitation or vomiting may also occur during intubation or extubation of the trachea, the following prophylactic techniques are being used with increasing frequency. Before induction of anesthesia (up to 2 hours) one ounce of oral antacid is administered. Maternal gastric pH will immediately rise above dangerous levels. If the patient is awake, intubation is not appropriate, and extremely rapid ("crash") induction of anesthesia is performed with intravenous thiopental and succinylcholine. Because muscular fasciculations caused by succinylcholine may be associated with increased intragastric pressure and a greater tendency for the patient to regurgitate, a 3 mg dose of curare is given 5 minutes before induction of anesthesia. An assistant applies cricoid pressure to compress the esophagus before and during endotracheal intubation. The endotracheal tube is left in place until the patient awakens; she is placed on her side in the head down position, and with suction apparatus immediately available, the endotracheal tube is removed.

One of the greatest tragedies in medicine is death of a mother during childbirth. Complications of anesthesia account for up to 10 percent of all maternal deaths. Many of the deaths might be preventable by use of prophylactic techniques which have been discussed.

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Shnider SM, deLorimier AA, Asling JH, et al: Vasopressors in obstetrics: Fetal hazards of methoxamine administration during obstetric spinal anesthesia. Am J Obstet Gynecol 106:680-686, Mar 1, 1970

Halogenated Anesthetic Agents

The current status of halogenated anesthetic agents is best characterized by the term "unsteady state." While much new information is